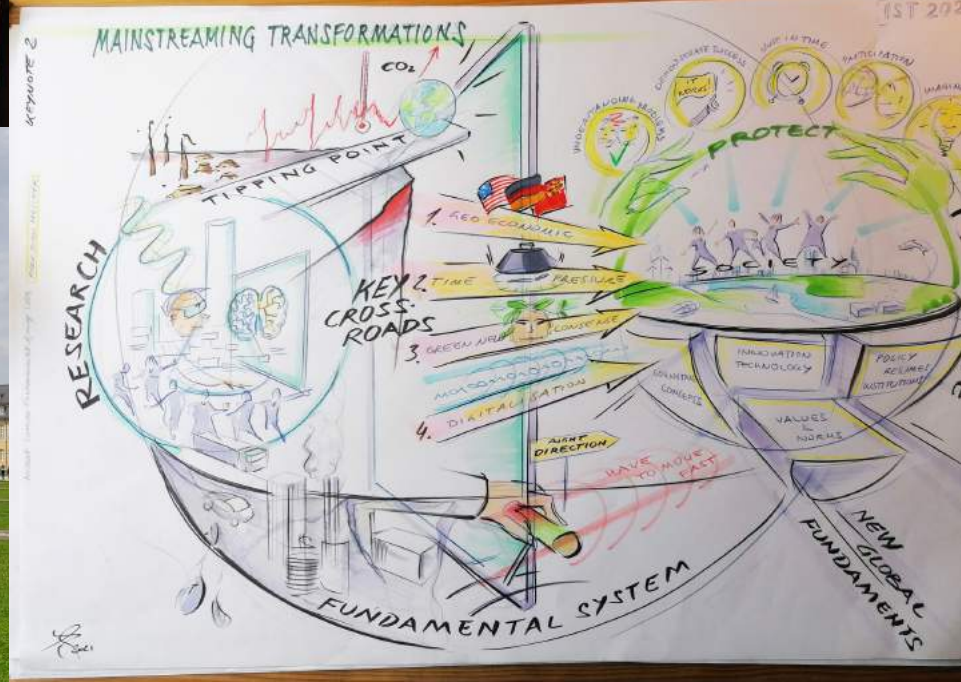


STRN Newsletter



N°42 | December 2021

Newsletter 42 – December 2021

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About

The STRN newsletter is published four times a year in March, June, September & December

Cover: Pictures from
IST 2021

Editorial

by Katharina Schiller & Jakob Edler,
Fraunhofer Institute for Systems and
Innovation Research SI



Back in 2020, while organizing IST 2021, our biggest headache was hoping for the possibility of being able to hold an in-person conference. Would the pandemic be subdued enough to allow for in-person attendance? If not for all, at least for some? But if only some could come, how to select? And what would be the added value of in-person participation for just a small group of people? Well, we got answers to some of these questions. After months of uncertainty, the pandemic situation remained unstable and for the second year in a row, IST had to take place online.

Looking back at IST 2021, what stands out the most for us as organizers is the dynamism and spirit created by the community during the conference. Even though many of us miss those stimulating ad-hoc encounters and camaraderie of in-person IST conferences, IST 2021 created a feeling of togetherness and community despite the fact that most of the participants were sitting by themselves, scattered around the world. And of course, like previous ISTs, it demonstrated the impressive breadth and depth of research on sustainability transitions: the 501 conference participants held a total of 335 presentations in 139 different sessions covering the 10 STRN research agenda themes (Köhler et al 2019) and the conference theme. A big thank you to everyone who joined the conference, and a round of applause for the organizing team and the scientific committee!

IST 2021's theme of 'mainstreaming transitions' was illuminated from many angles, e.g. envisioning scenarios for different sustainable futures; knowledge-sharing, learning, capacity-building, or co-creation by a plethora of stakeholders; directionality and mission-orientation of innovation systems. Beyond questions of ethics, the idea of just transitions gained traction and resonated in contributions across several tracks. As suggested in the editorial by last year's conference organizers (37th STRN Newsletter), financing for transitions received growing attention, as did the roles of international organizations.

Looking to the future, we see room for continuing and strengthening research and outreach in the previously mentioned areas and beyond, as sustainability transitions become more mainstreamed.

Even though the pandemic situation continues to generate uncertainties, we remain positive and hope that we will have the opportunity to meet in-person at an STRN event next year!

EIST Journal

EIST [Volume 41](#) is out now. Celebrating the journal's 10 year anniversary, it includes a collection of 27 viewpoints with suggestions for future research in the field of transition studies. This [article](#) by the EIST editors provides a short and concise overview.

The volume also features a [reflection](#) by Jeroen van den Bergh on his experiences as the (now former) editor-in-chief and a computational-linguistic [analysis](#) by Ivan Saving and Jeroen van den Bergh of the topics of 465 articles from June 2010 to June 2021.

Bernhard Truffer,
Editor in Chief, EIST
Bernhard.truffer@eawag.ch

STRN Events



7th NEST Conference, Lyon, May 5-6, 2022

We are excited to announce that the 7th NEST Conference will take place in Lyon, France! The conference will be held under the theme “*Global Sustainability Transitions: Towards Collaboration among Early Career Researchers*”.

The organizers believe that tackling global crises requires global research perspectives, and that the field of sustainability transitions is primarily dominated by work from the Global North. Together with you, we want to take a step towards bridging this gap. The two-day conference aims to serve as a platform for Ph.D. students and postdoctoral researchers to help understand and address the present and future challenges of sustainability transitions globally.

Next to welcoming submissions that address these structural inequalities and uneven distribution of resources across geographies, we also invite submissions over a wide range of theoretical and empirical topics in the transitions field. This includes, but is not limited to, understanding transitions; power,

agency and politics; governing transitions; civil society, culture, and social movements; businesses and industries; transitions in practice and everyday life; geography of transitions; ethical aspects; and methodologies.

We expect a range of interesting sessions, keynotes from diverse academic perspectives, and creative formats to facilitate exchange.

The host university for the conference will be École Normale Supérieure (ENS) of Lyon and in line with the theme, we have opted for a **hybrid format** (online+on-site) to enable accessibility for participants worldwide, especially for the growing transition community from the global south.

For continuously updated information on the conference please visit our website [here](#). The full Call for Abstracts can be found [here](#). Please submit your Abstract (max. 400 words) and a short biography of all authors (max. 150 words) via our abstract submission system [here](#).

The deadline for submission is the 15th January 2022 and the communication of the submission outcomes will be mid-February 2022. We are also accepting abstracts for session contributions more generally; if you would like to run a workshop, panel discussion, or contribute through another interesting format, please also reach out via email: nestconference2022@gmail.com.

We are looking forward to receiving your contributions! Don't forget to use the hashtag #7thNEST in your public communication about the conference and visit the NEST blog [here](#) for impressions of the previous NEST conferences and updates on other ongoing activities!

Your NEST-2022 Organizing Team

NEST Webinar, December 16, 2021



We are very happy to announce the last NESTwebinar in 2021 with Prof. Floor Alkemade on (successful) Innovations in Sustainability Transitions. The webinar will take place **Thursday 16th of December, 09:30 CET**.

To receive the Zoom login information, please register here: <https://forms.gle/KB3Ywd24sbxGednj6>

As a side note, this will be my (Julius') last NESTwebinar as a co-host and member of the organizing team. It was a great pleasure to kick-start the series with Machteld, Leo, and Abe. Yet, it is now time to move on and to pass the baton to the next NEST generation.

Thanks to all our guests for believing in the project and dedicating their time to educating the next generation of sustainability transitions scholars: Jochen, Marko, Frank, Karoline, Flor, Niki, Lars, Lea, Bruno, Derk, Paula, Marc, Bolie, Johan, Mónica, Kirsten, Floor.

Warm wishes from the NEST webinar organizing team, Abe Hendriks, Leo Frank, Machteld Simoens & Julius Wesche

Other Events

TIP Conference, January 17-21, 2022

The Transformative Innovation Policy Consortium (TIPC) and the European Forum for Studies of Policies for Research and Innovation (Eu-SPRI) invite STRN members and collaborators to [join the 2022 TIP Conference](#), to be held digitally 17-21 January 2022.

The theme is 'Building a Sustainable Knowledge Infrastructure on Transformative Innovation Policy (TIP)' and the event will advance research on the orchestration, coordination and analysis of innovation policy that is transformative, and give substance to a knowledge infrastructure sensitive to the social and political realities of Global South and North.

TIPC Learning Series 2022

TIPC also continues its free Open Learning Series in 2022. This provides spaces for scholars and practitioners working on transformative policy approaches around the world to refresh their knowledge, connect and learn from one another, with the aim of shifting the narrative for STI policy towards a focus on transformation and the SDGs. The content is reflexive, responding to calls from member agencies and researchers, and TIPC welcomes participants and proposals from across geographical regions. More [details here](#).

News



New STRN Logo and website design

We are delighted to announce that the new [STRN website](#) and logo, which were teased at IST 2021, are now live. This is expected to be the first step in a longer term project, perhaps involving an improved searchable database of the network, a moderated forum, and more. It is our hope that this digital renewal places the network on solid footing as we move forward with our professionalization efforts.

A quick note on the visuals. The circular elements of our new logo are meant to convey expanding waves of disruption as sustainability transitions accelerate. The blue is retained from our legacy website and logo to build on our past. The landing page animation is inspired by the alignment of multiple factors shaping pathways to sustainability.

We thank Daniel Rosenbloom for his lead in the project and EB Media for the website implementation.

Sustainability transitions India network

We are happy to announce that a small group of scholars have come together at IST2021 to form the "Sustainability Transitions India" network. This is a network of scholars interested in sustainability transitions research in India. Through this network, we envision to offer a platform for transition scholars and practitioners, both experienced and early-career, who are working on systemic change, innovations and just sustainability transitions in rural as well as urban contexts in India to come together for capacity building, knowledge sharing, and collaboration.

This network is a regional hub of the [Transitions in the Global South](#) network, a thematic subgroup of STRN. Given the diversity of ongoing transitions research within India, we want to build a platform exclusively focussing on bringing together the expertise of Indian scholars and practitioners. Given that there are colleagues and practitioners in multiple universities, research institutes and policy and civil society organisations, an important task will be to mobilise these diverse actors.

The network will primarily be coordinated from India, with support from scholars in the STRN network and its sub-groups. We are currently planning networking events and knowledge-sharing activities for the 2022

and we welcome ideas and inputs at this initial stage of building our network.

We invite scholars working on transitions in India, may that be from within or outside India to join the network and contribute in the knowledge sharing. If you are interested to be part of the network, please drop us an email at sustainabilitytransitionsindia@gmail.com with the subject line "Joining the network".

Transition Accelerator making progress driving net zero pathways

The [Transition Accelerator](#) is a pan-Canadian not-for-profit dedicated to the practical advancement of sustainability transitions. Drawing inspiration from transition research and practice, it champions an [approach](#) to co-develop and build out transformative pathways.

The Accelerator has made major progress deploying this approach since it was established in 2019. It has helped drive the transition to a net zero hydrogen economy in Canada, launching [the first Canadian hydrogen hub](#) in April 2021. Through its [Canada Grid](#) initiative, the Accelerator has also pursued the integration of electricity systems in Canada with the aim of enabling net zero societal electrification. Moreover, the Transition Accelerator has advanced net zero electric mobility transformations in Canada through a [national alliance](#) working to strengthen the ZEV supply chain. Also of note, the Transition Accelerator has published a [decision support tool](#) for realizing net zero pathways in multiple sectors. This tool has inspired the development of a [condensed course](#) to equip industry and policy leaders with the knowledge needed to strategically envision and build out net zero pathways.

For additional information please contact [James Meadowcroft](#).

New Projects

CaptureX - Socio-technical drivers, opportunities and challenges for large-scale CCUS

There is a general consensus that carbon capture and storage (CCS) technology will be necessary in order to keep global warming under 2 °C. Recently, CCS has gained momentum, with the Norwegian Government allocating NOK 16.8 billion to the Longship project, which seeks to establish a full-scale value-chain for CCS. In CaptureX we aim to understand the drivers and barriers for successfully establishing this value chain. Departing from the multidisciplinary sustainability transitions research field, CaptureX builds on a socio-

technical perspective to analyse the innovation dynamics related to the establishment of CCS. The project investigates innovation processes across the value chain of CCS and carbon capture and utilization (CCU) and elaborates on how the technology strategies and business models of key industrial actors and regional industrial transformation processes may affect CCUS innovation, and vice versa. CaptureX also investigates the role of legitimization processes and policies in supporting, (or potentially hampering) the development and diffusion of CCUS technologies, and finally explores the role of CCUS as a mitigation strategy in future energy systems and Norwegian energy exports. The project will last until the end of 2024 and is funded by the Research Council of Norway over the CLIMIT programme. Research partners: SINTEF, University in Oslo, NTNU, Chalmers University of Technology and SINTEF Energy Research.

More information on the [home page](#).

SIAMESE – Social Innovation for Adaptation and Mitigation. Experimentation for Transformative Climate Governance

In SIAMESE, we examine the socially innovative elements of experimental approaches to climate change adaptation and mitigation in Austria. The project aims to understand how social innovation in climate action comes to fruition, which agential, practical-organizational and territorial aspects are key and thus deserve to be amplified, and what policymakers and planners can learn from exemplary experiments to elevate sustainability transitions and transformative climate action.

For more information, please contact the project coordinator, [Johannes Suitner](#), and follow us on [ResearchGate](#).

EIT Climate-KIC Transitions Policy Labs

The European Green Deal is the EU's strategy to move towards climate neutrality and circular economy by transformative innovation policy. Sustainability transitions are particularly relevant for cities and regions in Southern and Central Eastern Europe, needing to work simultaneously on economic development, spreading innovation, and ecological transition. The [Transition Policy Lab](#), designed to support countries that are part of the EIT Regional Innovation Scheme, addresses the goal of shifting practices for policymaking by removing barriers for enabling the necessary institutional change. It is aimed to build capacity to co-design and implement systemic strategies that can lead to transformative policies and actions.

During 2021, EIT Regional Innovation Scheme Transition Policy Labs has consisted of five interrelated capacity building activities implemented through three different formats multi-stakeholders setting, science-based training and executive programmes. Activities has been implemented in collaboration with the Joint Research Centre, DRIFT, VITO, the Transformative Innovation Policy Consortium and the Austrian Institute of Technology. The webinars corresponding to those activities are available [here](#).

Open positions

Postdoc Academy for Transformational Leadership

The [Postdoc Academy for Transformational Leadership](#) is a unique program that develops the next generation of leaders in sustainability research affiliated with a European research institution. With this year's focus topic: [Racing to climate justice? Debating the multiple temporalities of just transformations](#)", the program provides an intensive training with four seminars in two years that broaden the research competencies of early-career researchers and promote their qualification towards transdisciplinary leadership.

The program also offers seed funding to groups of participants planning to initiate research collaborations. The program is an initiative of the Robert Bosch Stiftung, together with four academic centers Humboldt-Universität zu Berlin (IRI THESys), Leuphana University of Lüneburg, Stockholm Resilience Centre and The Dutch Research Institute for Transitions (DRIFT), Rotterdam.

Click [here](#) for further information on the application process, please see and refer to the flyer attached.

Applications can be submitted until **15th February 2022**. We look forward to receiving applications from excellent candidates from your institution and networks.

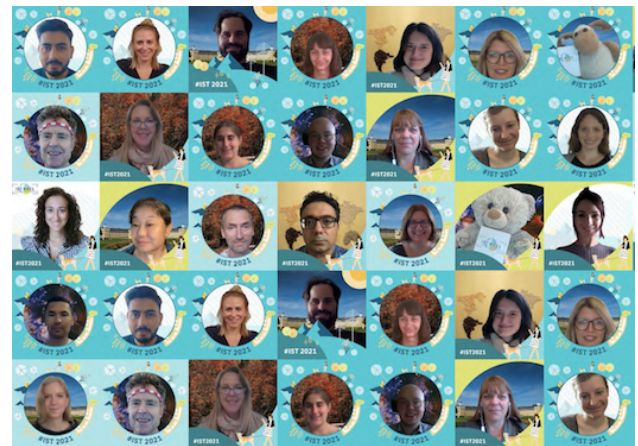
Coordinating Office: [Wiebke Hampel](#) / [Kathrin Klementz](#)

Graduate student positions at the University of Waterloo

Prof. Sarah Burch is recruiting one new PhD student and one Master's student to pursue their degree under her supervision at the University of Waterloo. Excellent candidates with interests in sustainability entrepreneurship and urban transformations, including those with inter/transdisciplinary expertise in environmental governance, sustainability science, transitions, and related fields are warmly encouraged to submit materials to me by **January 7th, 2022**.

The following link provides [details](#).

IST 2021 Impressions



Personal impressions by Asli Ates

I would like to start by thanking everyone who was involved in organising IST2021. Being one of last year's SPRU PhD Forum organisers, I can only imagine how much of an effort a conference of that size requires, and I highly appreciate all the work (and soul) poured into this conference.

My favourite part of the conference was the first day's networking event, as I was able to meet and interact (although limitedly) with very cool people from different parts of the world and discuss on various interesting topics: what is our role as academics, why and what for we do research, or our motivations behind working on a sustainability topic.

While it was the second time I attended an IST conference, it was my first time as a presenter, and the first opportunity to publicly talk about my PhD work. Having been just a bit anxious before, it was a confidence boosting experience to present and discuss with people – especially after more than a year of physically very much isolated work.

Even though, I don't consider myself as a core member of the transitions community, IST 2021 felt like a space that I could "open-up" - not only my work but also my thoughts on (academic) life. I believe this is a rare feature for an academic community which deserves extra credit to be given to all the people who worked hard to make the conference as inclusive and welcoming a place as possible - especially for early career researchers and newcomers.

Moving beyond IST2021, I would like to share some questions that I would be very keen to discuss in future events.

- How can sustainability transitions perspectives be communicated to people without necessarily expecting them to have gone through a "Transitions 101"?

- How can socio-technical systems understanding be explained without jargon and a very deep knowledge base (like a master's degree in innovation studies), so that it can be discussed at a wider scale as an alternative approach to pure "techno-fixes"?
- And how does the transitions community position themselves in the global climate policies and politics, or sustainability topics more broadly?



Personal impressions by Abdullah Fahimi

I am a Berlin-based PhD student in my final year. I have attended two IST conferences – in 2020 and 2021. Both were truly great experiences in many ways. At IST 2021 I also acted as a conference ambassador and am grateful for this opportunity. In both IST conferences the organisers have tried to take diversity very seriously (e.g., in terms of tracks and sessions, representation from global South and global North, and research methods and foci). I think this is great. A quick look at the program and list of presenters confirms this. Even though there is only a one-year interval between IST conferences, it is remarkable how fast the field grows. At IST 2021 there were a huge variety of sessions.

What I liked the most about the latest IST conference were the sessions on transitions in the global South (including Mónica Ramos Mejía's keynote), Just Transitions, and thematic group sessions on the Geography of Sustainability Transitions. My research, energy transitions in Afghanistan, has benefited a lot from the discussions in these sessions. Also, and more importantly, all these tracks and sessions help us understand other contexts and perspectives and not just Western (European) ones. I really hope future IST conferences build on these insights and contribute in any way possible to diversity and decolonising knowledge production. I also very much liked the newcomers' session: it always provides a great overview of key concepts, methods, and developments in the field and I really liked this year's inputs by Johan Schot and Floor Alkemade. Where the IST could and probably will improve is expanding sessions on just transitions and the global South.

In addition to the academic content, IST 2021 provided me with the opportunity to interact with researchers from

all over the world. After two years of online IST conferences, it would be nice, of course, to experience an in-person IST in the future.

Personal impressions by Aline Scherrer

I am a 2nd year PhD student in the field of sustainability transitions with a focus on multi-technology interactions and zero emission vehicles from an actor perspective. As part of the conference organization team, it was my first time to be involved with the IST conference „behind the scenes“. Seeing the event come to life was therefore an extra special experience for me this year. The hope for an in-person or hybrid event persisted almost until the end but I am very happy with how the online format turned out. I was lucky to be able to visit our „command centre“ in Karlsruhe on the first full conference day already and therefore got into the conference spirit really quickly. But I also heard from many online participants that the great morning welcomes prepared by Katharina Schiller and her studio guests had a similar effect for those attending from their homes or offices! To me, these recurring live sessions were a central and really valuable element of the conference.

As an attendant, I especially appreciated the diversity of the program, in both themes and session formats, and the continuous motivation with which the community shows up to support each other and provide feedback. I was able to discuss my work in a paper session with many junior and senior colleagues who even sent me messages afterwards to follow up on some aspects.

I also got inspired by the keynotes, especially on the impact of teaching, which Lea Fünfschilling put into perspective so effectively. I think in this community, because of its interdisciplinarity, we are not only teaching students but constantly teaching and learning from one another. The IST 2021 was a great place for that and I am looking forward to many more exchanges in the future, ideally with a mix of digital and in-person elements.



Publications

PhD theses

Ferreira, L.G, (2021)

International Relations School, Pontifical Catholic University from Minas Gerais, Brazil

From innovation to socio-political change: The European Union energy transition network mobilized for sustainability transition.

[link](#)

The thesis analysis the formation of a Renewable Energy Technological Innovation System (RETIS) based on collaboration between experts in the European Union and the coordination of political actors to enable an energy transition and reducing their economic and political dependency. As a theoretical framework, we developed the "Two scales framework" to deal both with public science and the politics of RET on an international level. We mobilise the Technological Innovation System, policy mix, different power and epistemic communities approaches to form the framework coherently. Our data was collected on different databases, such as REGPAT, SCOPUS, IEA, IRENA and Eurostat for descriptive statistics and social network analysis, and official documents for content analysis. We identified the evolution of the RETIS from 1989 until 2019 and their impacts on the European Union energy transition. We found out that the collective knowledge production of RET concentrates in Germany, France, Italy and Spain. Moreover, we observed that these Members are far ahead on the scale up to a new energy sector and the EU level. At the same time, some lagging countries, such as the Baltic States and others, still do not evolve at the same pace in terms of investment in RET and knowledge production. We concluded that there is an asymmetrical energy transition in the European Union based on knowledge production, investments and energy balances.

Kopp, A. P. (2021)

University College London, London, UK

Networked Transitions: Policy Coordination in Socio-Technical Innovation Systems.

[link](#)

Governments worldwide increasingly address challenges, such as climate change or sustainability transitions, through mission-oriented innovation policies, i.e. systemic policies that cut across sectors to target a societal problem. Achieving such missions requires socio-technical change and often results in so-called multi-technology innovations: technologies that comprise a set of complex, interacting sub-technologies

of diverse characters and cater a multitude of socio-technical purposes. These innovations pose a challenge: They trigger coordination problems across policy domains, across government organisations with different interests, capacities, and mandates, as well as across policy design and implementation. However, although coordination problems are not new to public policy scholars, they remain largely unaddressed in the innovation policy context. Likewise, the innovation studies literature hardly considers the influence of public agencies in innovation systems. Combined, this merits the research question: How do public sector organisations and socio-technical innovation systems mutually shape each other, particularly in the context of mission-oriented policies? This thesis investigates the innovation systems of autonomous vehicles as an example of a multi-technology solution resulting from mission-oriented policies in three highly innovative economies: Singapore, Estonia, and Sweden. Relying on network analyses, semi-structured interviews, and process-tracing, it compares how hierarchical, market-based, and network-oriented policy coordination arrangements shape the public administration's impact on the innovation system and vice-versa. In conclusion, socio-technical innovations, due to the challenges they trigger, shift policy coordination arrangements towards (intensified) network-oriented approaches. Accordingly, government organisations collaborate to enable the innovation system, rather than controlling it top-down or through market-based arrangements. 'Networked transitions', hence, allow systemic feedback loops to integrate policy design and implementation, to mitigate coordination failures, and to accelerate the system's development towards fulfilling 'the mission'.

Noll, D. (2021)

Institute of Social Ecology, Alpen Adria University, Vienna, Austria

Can a small island be sustainable? The role of material stocks and livestock in shaping the sociometabolic transition of the past, present and future on the Greek island Samothraki.

[link](#)

This thesis is empirically capturing effects of the global sociometabolic transition of the past 100 years on the socioecological system of a small Greek island. By applying the conceptual framework of socioeconomic metabolism (SEM) to the local island level, it is possible to reconstruct the biophysical economy for the island Samothraki from 1929 – 2019. The 5 texts contained in this cumulative thesis are dedicated to achieving an academic goal while at the same time contributing to a transdisciplinary process on the local level. The transformation from traditional to modern building techniques in combination with the expansion of material stocks creates legacies that will shape the

island for decades and centuries. The increase in livestock units resulted in decades of overgrazing, triggering erosion that will be visible in the island's landscape for decades to come. Once based on a circular economy that was built upon locally available materials and exclusively biomass for energetic purposes, the island's population imports 50% of their food and 100% of their other used materials today. The sociometabolic assessment enables the definition of potentials for a long-term reduction of the island's unsustainable material use patterns and non-renewable waste generation. The final part of this thesis reflects upon the role of science and the significance of sociometabolic research for supporting transdisciplinary processes fostering a sustainability transition on a local level.

Phirouzabadi, A. M. (2021)
Newcastle Business School, University of Newcastle

A dynamic approach to technology interaction in the era of ferment

[link](#)

It is critical to investigate the development of technologies in relation with each other, especially in sectors such as energy and transportation that struggle with grand challenges. This thesis takes a biological perspective and investigates whether technologies in the early stage of their technological life cycle, known as 'era of ferment', interact with one another in the same way that populations do in an ecology. A multimodal and multidimensional technology interaction framework is proposed using the Technological Innovation System (TIS) and the biological relationship modes. The proposed framework is applied to powertrain technologies in US automobile market through a mixed method research of narrative, quantification, and simulation between 1985 and 2050. Findings reveal that while inter-technology relationships extend beyond pure competition or symbiosis (e.g., parasitism and commensalism), they establish around both implicit and explicit dimensions (e.g., artefact, knowledge, policies, and expectations). This thesis mainly contributes to the path dependency and sustainability transition literatures by revealing that transitions processes are not only a result of path creation and path destruction, but also a result of cross-path socio-technical interactions via positive and negative externalities. Particularly, the TIS framework is made more outward oriented—first by proposing 'co-dynamics' as a complementary dynamical unit of analysis to the conventional structural couplings, and second by proposing 'motor of creative destruction' and 'motor of creative accumulation'. Policy makers are informed of when, and to what extent, they should invest in emerging technologies, divest from incumbent technologies, or pursue an intermediate solution

between new and incumbent technologies, while avoiding any dead ends.

Rohe, S. (2021)
Carl von Ossietzky Universität Oldenburg
Zooming in on a multi-scalar innovation system: The role and relevance of regions in the onshore wind energy sector in Germany

[link](#)

This cumulative dissertation (one framing paper and four individual research papers) analyzes the regional facets of the multi-scalar Technological Innovation System (TIS) around onshore wind. It provides a comprehensive literature review on the geography of the wind energy TIS. Previous research focused on early system dynamics in turbine manufacturing and pioneering regions. It usually characterizes the TIS as spatially sticky. Yet, multiple gaps remain in our understanding of the regional level in this TIS. They concern the role, relevance, and spatiality of innovation processes in various regional contexts, across the value chain of the industry, and over the technology's life cycle as the TIS becomes more established and mature. These research gaps are empirically investigated through depth-case studies about the wind sector in five German regions. Results are presented in four individual research papers. Overall, the dissertation provides a more nuanced view on how the importance of spatial proximity varies across a technology's value chain and for different innovation system resources. Furthermore, it highlights and systematizes variances between innovation processes in regions and how they are impacted by developments at the national or global scale, or by shifts in broader socio-technical systems. Elements of established TIS do not automatically stabilize, as is shown using the examples of 'networks' and 'technological legitimacy'. These insights offer advice to practitioners on where companies could concentrate their efforts to develop and utilize wind turbines most efficiently. Understanding the spatial dimension of this TIS might also improve place-specific policies aiming to build up and support regional wind industries or roll out turbines more rapidly.

Smeds, E. (2021)
University College London (UCL)
Urban Mobility Transitions: Governing through Experimentation in Bristol and New York City.

[link](#)

Transitions away from car-dominance is one of the key debates in urban research, policy and practice today. Car-free public space, cycling and convenient public transport services are widely seen as desirable, yet the reconfiguration of our streets and transport networks has been incremental. This doctoral research examines

how mobility in cities is governed through experiments, commonly understood as pilot projects, and whether experiments hold potential for transformative change in urban mobility systems, including transitions away from automobility. The research draws on a synthesis of sustainability transitions, transport studies and urban studies literature, and traces the outcomes of 108 experiments undertaken over two decades in two cities: Bristol (UK) and New York City (USA) between 1996/7 and 2016. The findings demonstrate that experiments can contribute to transforming the physical shape of urban mobility systems and the institutions involved in governing them, and can even contribute to transitions, if assessed as change in commuting patterns away from car use. The research compares the capacity of respective municipal governments, Bristol City Council and NYC city government for 'transformative experimentation', and presents an institutionalist analysis of why the transformation of Bristol's mobility system was more limited than NYC's. To unpack the problematisation of piecemeal, 'project-based' experimentation driven by competitive funding landscapes, the research compares Bristol City Council and NYC city government as two municipalities with a different degree of reliance on external funding. The stronger capacity of NYC city government can be explained by its higher degree of fiscal autonomy and mobility policy discretion, whereas Bristol City Council's capacity was limited by the centralisation of the UK state. Yet the thesis also shows that both municipalities pursued successful endogenous strategies in response to multi-scalar structure, and points to organisational and governance practices that can create 'political space' for urban actors to further transitions.

Books

Aagaard, A.; Lüdeke-Freund, F. and Wells, P. (Eds.) (2021)

Business Models for Sustainability Transitions – How Organisations Contribute to Societal Transformation.

Palgrave Macmillan.

[link](#)

Can innovations in business change society? Can innovations in society change business? These two questions have become critically urgent in recent years, but are rarely considered together. 'Business Models for Sustainability Transitions' therefore asks, can contemplating both concepts together result in a flourishing, sustainable future? Technology alone cannot save us. We cannot consciously consume our way out of trouble. This book represents a start at bridging the dynamic world of business model innovation with the constant and unprecedented transitions underway in the world around us. For

researchers, practitioners, and policy makers, the coupling of the two questions has the potential to unlock answers to our grand global challenges with responses that are at the same time rapid and enduring. This work offers unique and considered glimpses into what it may take to harness wide-ranging innovations for the collective good.

Fokdal, J., Bina, O., Chiles, P., Ojamäe, L. and Paadam, K. (Eds.) (2021)

Enabling the City: Interdisciplinary and transdisciplinary encounters in research and practice.

Routledge, New York and Abingdon

[link](#)

Enabling the City is a collaborative book that focuses on how interdisciplinary and transdisciplinary processes of knowledge production may contribute to urban transformation at a local level in the 21st Century. It is designed to respond to the growing appeal for transformative change, by exploring the often inconvenient and uncomfortable spaces of knowledge production and co-creation that can make such change happen. Combining global trends in theory with experience of local practice, *Enabling the City* strikes a balance between enthusiastic support for such transformational potential and a cautious note regarding the persistent challenges to the ethos as well as the practice of inter and transdisciplinarity. The reflexive approach that runs through the book aims to respond to international (SDGs), national and local agendas, offering new forms of understanding collaborative process and ways of knowing that are essential in urban research and practice.

Enabling the City translates the lessons learned from these studies into a comprehensive framework of four phases of inter- and transdisciplinarity, and four enabling conditions and qualities that are crucial to such collaborative processes, highlighting aspects of learning, competences and dispositions: knowing what phases are critical in any collaborative and participatory process and making an early effort to allocate human and financial resources as well as time to each phase; and valuing and enabling mutual and transformative learning, and the dispositions of trust and humility - will make a world of difference.

Through these European, multi-scale accounts, this book will inspire scholars and practitioners alike to strive for transformative solutions for more sustainable urban futures.

Hawkins Kreps, B. and Cobb, C. W. (Eds) (2021)

Energy Transition and Economic Sufficiency: Food, Transportation and Education in a Post-Carbon Society.

[link](#)

Will the winding down of fossil-fuel consumption lead to radical changes in our lives? Or can we turn away from the climate crisis cliff while the industrial economy just keeps growing?

Civilizations can, once again, be powered by renewable energy sources. But usable, net energy will become a precious resource, as it was before our brief and explosive experiment with fossil fuels. We will have to recognize when “enough is enough.” Sufficiency, not growth, needs to be the focus of the new economy.

Fourteen chapters by twenty authors discuss changes in food production and distribution, urbanization and rural revitalization, cargo transportation, energy generation, law, and education. They show how aspects of contemporary technology, plus lessons from our history, can help us move to a “sufficient economy”.

Renewable energies will not save our always-on, constantly growing, high-energy economy. But if we share the wealth to produce what we really need, renewable energies can power a sustainable civilization.

Papers

Annala, S., Ruggiero, S., Kangas, H., Honkapuro, S., and Ohrling, T. (2021)

Impact of home market on business development and internationalization of demand response firms.

Energy, in press

[link](#)

The transition toward more renewable-based energy systems increases the need for new flexible resources, such as demand response (DR). Previous literature has found various barriers for DR utilization, but much of this research has focused on the initiation of DR operations or barriers in national markets and not on factors that hinder market upscaling and firm internationalization. We address this gap by analyzing interviews with 22 DR companies active in Finland, one of the early mover countries for automated DR. While most of previous research has focused on electricity DR, our interviewees also include district heating DR companies. By using the Technological Innovation System (TIS) framework, we study how the advanced regulatory and market framework and the technology rollout in Finland have affected the DR service development and the internationalization of Finnish companies. Based on our results, the DR market formation in Finland has largely relied on the Finnish transmission system operator's early decision to allow independent aggregation and the early large-scale rollout of smart meters. The advanced home market has enabled firms to develop new solutions and prove their concept. Yet, the highly structured nature of energy markets complicates the access to both advanced and

less advanced foreign markets.

Bauer, F.; Hansen, T. & Nilsson, L.J. (2022)

Assessing the feasibility of archetypal transition pathways towards carbon neutrality – a comparative analysis of European industries.

Resources, Conservation & Recycling, 177, 106015

[link](#)

Analyses of the future for manufacturing and heavy industries in a climate constrained world many times focus on technological innovations in the early stages of the value chain, assuming few significant changes are plausible, wanted, or necessary throughout the rest of the value chain. Complex questions about competing interests, different ways of organising resource management, production, consumption, and integrating value chains are thus closed down to ones about efficiencies, pay-back times, and primary processing technologies. In this analysis, we move beyond this to identify archetypal pathways that span across value chains in four emissions intensive industries: plastics, steel, pulp and paper, and meat and dairy. The pathways as presented in the present paper were inductively identified in a multi-stage process throughout a four-year European research project. The identified archetypal pathways are i) production and end-use optimisation, ii) electrification with CCU, iii) CCS, iv) circular material flows, and v) diversification of bio-feedstock use.

Bergek, A., Bjørgum, Ø., Hansen, T., Hanson, J., and Steen, M. (2021)

Sustainability transitions in coastal shipping: The role of regime segmentation.

Transportation Research Interdisciplinary Perspectives, 100497

[link](#)

Maritime transport has received little attention in sustainability transitions research. This sector is mature and heterogeneous, which suggests the need for a more nuanced perspective on socio-technical regimes to understand variation in conditions for adoption of novel technologies that may support sustainability transitions. We consider this important in order to develop more efficient policy to decarbonize the shipping sector. We develop a framework that explicitly differentiates task and institutional environment of user regimes, enabling us to identify regime segmentation and its influence on three key transition conditions: technology maturity and fit, system integration and infrastructure, and acceptability and legitimacy. We apply our framework to analyse development and uptake of battery-electric energy storage solutions within three segments (coastal ferry, coastal fishing, and

offshore supply) of Norwegian coastal shipping. Our analysis suggests that the transition process unfolds along different pathways in different user segments, pointing to a need for segment-specific policy instruments.

Bours, S. A. M. J. V., Wanzenböck, I., and Frenken, K. (2021)

Small wins for grand challenges. A bottom-up governance approach to regional innovation policy.

European Planning Studies

[link](#)

Grand societal challenges as a policy target have received increasing attention in regional innovation policy. To date, concrete governance strategies to address such challenges with local solutions are underexplored. We propose a small wins approach as a new governance strategy to deal with wicked societal problems. A small wins strategy focuses on accelerating bottom-up initiatives guided by a shared mission. The aim is to activate propelling mechanisms to support and couple self-organizing change processes. We studied 17 regional initiatives for plastic pollution removal in the Netherlands, which show that i. institutional barriers are the hardest for small wins to overcome and achieve wider impact; ii. bottom-up propelling mechanisms reinforce each other, but are generally too weak to transform existing practices due to limited policy support; and iii. systemic propelling mechanisms are largely absent to achieve robust change processes across scales. We see a key task for regional policy to activate systemic mechanisms that help local solutions upscale. This requires policy to learn about the plurality of change processes ‘on the ground’, and to use multi-level governance arrangements to create coherent policies to scale up bottom-up solutions.

Brock, A., Sovacool, B. K., and Hook, A. (2021)

Volatile Photovoltaics: Green industrialization, sacrifice zones, and the political ecology of solar energy in Germany.

Annals of the American Association of Geographers, 111(6), 1756-1778

[link](#)

The development of solar energy has been depicted as a paradigmatic break in unsustainable global growth, largely because it is framed as an innovation with minimal carbon emissions. On the contrary, drawing on literatures from spatial justice and political ecology, including on authoritarian populism, this article analyzes the rise and fall of the solar industry and the associated failures of “green industrialization” in Bitterfeld, East Germany—an area that is characterized by political, economic, and social peripheralization, marginalization,

and the rise of the far right. The development of solar energy, we argue, is merely the latest iteration of an industrial growth model that is rooted in a similar modernist mode of development. Based on original mixed methods field research in eastern Germany, it argues that many of the same inequalities that characterize fossil fuels and “gray” (de)industrialization—undemocratic and unsustainable industrial processes, the concentration of corporate power and profits, and externalized waste and pollution—are replicated by solar energy. What is distinct is the fact that such contemporary “green” manufacturing processes appear to negatively affect a wider and more dispersed range of spatial locations, also denying these locales the benefits of accumulation, production, and consumption. This unevenness reflects the reconfiguration of global supply chains over the past thirty years and the nature of green production processes that depend on a wider range of inputs that invariably produce localized sacrifice zones. We offer a spatial justice framework for solar energy, zooming in at the manufacturing stage, to explore the multiple sacrifice zones at the different stages of solar energy. Finally, we highlight the politics of resignation that is the product and foundation of capitalist realism that serves to dispossess communities around solar energy manufacturing sites in eastern Germany and might feed into the rise of the populist far right. The article contributes to the emerging critical literature that analyzes the dark side of renewable energy and, in doing so, reveals the social and ecological costs of energy transitions that continue to be underresearched yet deserve heightened attention.

Bugge, M., Andersen, A. D., and Steen, M. (2021)

The role of regional innovation systems in mission-oriented innovation policy: exploring the problem-solution space in electrification of maritime transport.

European Planning Studies

[link](#)

The innovation literature increasingly addresses grand challenges and transformative change. However, the issue of to what extent transformative change can build upon the resources, actors and institutions of existing innovation systems has not received sufficient attention. Against this background this paper aims to advance our understanding of the geographies and continuities of transformative change, by exploring the role of regional innovation systems in mission-oriented innovation. Based on an in-depth case study of electrification of ferries in Western Norway, the paper finds that the accomplishment of the mission was in large part due to the fact that it created new regional economic opportunities and built upon and mobilized existing regional resources, actors and structures. This mission re-orientation of an existing regional innovation system

was characterized by (a) limited contestation, low complexity and low uncertainty about the technological battery-driven solutions pointed at, (b) multi-actor and multi-scalar agency and finally (c) asset modification of strong and pre-existing RIS structures, institutions and regulatory context.

Commons Network Team (2021)

Living well on a finite planet- Building a caring world beyond growth.

[link](#)

Today, both amongst policymakers and the wider public, there remains a dominant belief that regardless how wealthy a country becomes, its GDP should continue to rise. Questioning the continued expansion of GDP feels almost counterintuitive if we want to safeguard human health now and in the future. Yet, widening global inequalities and rising ecological catastrophes are telling us to do exactly this: to question the desirability and viability of further GDP growth in rich nations, and follow a post-growth vision instead. The acknowledgement that transitioning to a society that is more ecological and more just will be fundamental if we want to live well on a finite planet, lays at the heart of the recently launched field of Planetary Health. Following a post-growth vision for planetary health presupposes a radically different way of organizing our societies and economies. What could such a transformation look like? Degrowth is a post growth paradigm which brings together a movement of people who are rethinking and redesigning ‘a good life for all within planetary boundaries’.

Diluiso, F., Walk, P., Manych, N., et al. (2021)

Coal Transitions-Part 1: A systematic map and review of case study learnings from regional, national, and local phase-out experiences.

Environmental Research Letters, 16(11), 113003, 1-40

[link](#)

A rapid coal phase-out is needed to meet the goals of the Paris Agreement, but is hindered by serious challenges ranging from vested interests to the risks of social disruption. To understand how to organize a global coal phase-out, it is crucial to go beyond cost-effective climate mitigation scenarios and learn from the experience of previous coal transitions. Despite the relevance of the topic, evidence remains fragmented throughout different research fields, and not easily accessible. To address this gap, this paper provides a systematic map and comprehensive review of the literature on historical coal transitions. We use computer-assisted systematic mapping and review methods to chart and evaluate the available evidence on historical declines in coal production and consumption. We extracted a dataset of 278 case

studies from 194 publications, covering coal transitions in 44 countries and ranging from the end of the 19th century until 2021. We find a relatively recent and rapidly expanding body of literature reflecting the growing importance of an early coal phase-out in scientific and political debates.

Edomah, N. (2021)

The governance of energy transition: lessons from the Nigerian electricity sector.

Energy. Sustainability and Society. 11, 1–12

[link](#)

The rising need for transition towards more sustainable energy sources requires a rethink in the governance of energy systems. Arguably, policy makers have very important roles in governing transitions in any given society through established institutional frameworks. It has also been argued that energy infrastructure choices are determined by institutional dynamics and structures. However, what are the underlying influences required to change energy systems and what lessons can we draw from them for the governance of energy transition? This study focuses on understanding the dynamics of energy transition governance in the Nigerian electricity sector with the aim of drawing lessons that impact on energy transition and energy systems change.

Using explorative research tools, this study investigates the dynamics of energy transition governance in the Nigerian electricity sector with the aim of drawing lessons that impact on energy transition and energy systems change. Data from primary and secondary sources in documentary archives as well as other published sources that are linked with the provision of the Nigerian historical energy infrastructure were used for the analysis in order to draw lessons on energy transition dynamics in Nigeria.

Ehnert, F., Egermann, M., and Betsch, A. (2021)

The role of niche and regime intermediaries in building partnerships for urban transitions towards sustainability.

Journal of Environmental Policy & Planning, 1–23

[link](#)

The recent literature on intermediaries in urban sustainability transitions has studied their role as a translator between innovative niches and incumbent regimes. In urban sustainability transitions, intermediaries from both civil society and public institutions seek to bridge diverging world views and communicate innovative lessons learned back to the incumbent regime. How these intermediaries are embedded in local governance contexts and how the political dynamics inherent to urban sustainability transitions play out remains a research gap. As these transitions require political consensus-building, we explore the interaction between Transition Town

Initiatives (TTIs) as niche intermediaries seeking to transform society from below, and regime-based transition intermediaries operating from above. In a comparative study of four German cities, we analyse why and how niche and regime intermediaries build partnerships for urban transitions towards sustainability. While Transition Town Hannover and Bluepingu in Nuremberg have successfully established partnerships with the municipalities, Transition Town Göttingen and Transition Town Kassel have struggled in their efforts to do so. These differences can be explained by the interactions between structural conditions, political priorities and institution-building, as well as the proficiency of transition intermediaries.

Furszyfer Del Rio, D. D., Sovacool, B. K., and Griffiths, S. (2022)

Culture, energy and climate sustainability, and smart home technologies: A mixed methods comparison of four countries

Energy & Climate Change 2, 100035, 1-19

[link](#)

Smart home technologies (SHT) refer to devices that provide some degree of digitally connected, automated, or enhanced services to household occupants. Smart homes have become prominent in recent technology and policy discussions about energy efficiency, climate change, and the sustainability of buildings. Nevertheless, how might *culture* shape the diffusion and use of the technologies used in smart homes? What cultural barriers may impede their adoption, or embed more carbon-intensive lifestyles? Lastly, do smart home technologies truly promote sustainability goals? Based on an extensive original dataset involving expert interviews in four countries—Japan, the United Arab Emirates, the United Kingdom, and the United States—and original media content analysis, this study explores the cultural aspects of smart home technology adoption as well as the consequent impacts on sustainability. In doing so, the study elaborates on an array of social, technical, political, economic and environmental dimensions of smart home technology diffusion, with clear implications for research, policy, and technology development. In this sense, we call for more comprehensive, progressive, innovative and sensitive technology design so as to advance SHT adoption and fulfill some of the sustainability and climate objectives their advocates continually promise.

Gibbs, D. and Jensen, P. D. (2021)

Chasing after the wind? Green economy strategies, path creation and transitions in the offshore wind industry.

Regional Studies

[link](#)

There has been a growing interest by both academics and policymakers at the local and regional scales in the development of a green economy both to promote economic development and to achieve environmental policy aims. Despite this, there is little evidence about whether either the economic or the environmental aims are being met, nor how local and regional authorities are promoting and developing green economies in their localities. In order to address these issues, this paper explores the development of the offshore wind industry in North West Germany, drawing upon sustainability transitions research and the path creation literature.

Hess, D. J., and McKane, R. (2021)

Making Sustainability Plans More Equitable: An Analysis of 50 U.S. Cities.

Local Environment, 26(4): 461-476

[link](#)

Government plans and initiatives for the 50 largest U.S. cities were examined for connections between social equity and sustainability. Six sectors that are associated with sustainability (defined as the sector's potential to reduce greenhouse-gas emissions) were included: buildings, electricity, food, greenspace, pollution and air quality, and transportation. The study identified 261 plans and initiatives in the 50 cities during the 2010–2020 period that had connections between social equity and sustainability. Results indicate that cities still have many opportunities to improve plans and initiatives when undertaking revisions. To that end, 21 types of goals and initiatives are identified from the data set to show a composite picture of how cities can integrate social equity with sustainability in this area. Of the 21 types, only 7 appeared in more than 50% of the cities. The study also provides an analysis of opportunities for robust engagement, implementation, equity tracking, and connections of goals across sectors. An additional analysis shows that cities with greater attention to the sustainability-equity nexus tend to lean toward the center-left Democratic Party, to have higher education and income, and to have sustainability offices.

Iskandarova, M., Dembek, A., Fraaije, M., Matthews, W., Stasik, A., Wittmayer, J. M., and BK Sovacool, B. K. (2021)

Who finances renewable energy in Europe? Examining temporality, authority and contestation in solar and wind subsidies in Poland, the Netherlands and the United Kingdom.

Energy Strategy Reviews, 38, 100730, 1-14

[link](#)

In this paper, we explore the development of financing and subsidies for renewable energy in three fossil-fuelled European countries: Poland, the Netherlands,

and the United Kingdom. Financing for renewable energy is an existing arena involving multi-actor activities and practices that develop and implement (innovative) financial instruments to facilitate investments in renewable energy. This means that the paper focuses on different financial mechanisms – such as grants, awards, subsidies, crowdfunding, community bonds, ventures, social investment, as long as these funding instruments finance sustainable energy infrastructure and activities. The extent to which this is changing social relations and comes with new ways of doing, thinking and/or organizing is an empirical topic explicitly examined in the study. We first briefly define and conceptualize financial mechanisms and subsidies before explicating our mixed methods research design consisting of scoping, document analysis, 22 original expert interviews, and observational data from eight meetings and events. We then compare the recent history of solar and wind energy financing and subsidies in our three countries. These comparative cases reveal the temporality of subsidization, indicating fundamental changes in the patterns and logics of financing over the past two decades. They reveal shifts in authority and an expansion of actors involved in financing. They lastly reveal tensions and contestations in financing, including gaps in coverage and conflicts among stakeholder groups. We conclude with future insights for renewable energy diffusion, innovation, and policy.

Kanger, L. and Sovacool, B. K. (2022)
Towards a multi-scalar and multi-horizon framework of energy injustice: A whole systems analysis of Estonian energy transition.

Political Geography, 93, 102544, 1-13

[link](#)

The shift from carbon-intensive to low-carbon energy systems has profound justice implications as some regions are likely to lose as much as gain from decarbonization processes. Increasing calls have been made to adopt a 'whole systems' perspective on energy justice. Drawing on the Multi-level Perspective on socio-technical transitions this paper presents a new comprehensive framework of energy justice in system innovation, proposing to map injustices along three dimensions: 1) multiple spatial scales (regional, national, international); 2) different time horizons (currently experienced vs. anticipated injustices); 3) connections to transition dynamics (injustices related to the optimization of the currently dominant system, destabilization of the incumbent system or the acceleration of alternative solutions in niches). The framework is applied to analyse the ongoing energy transition in Estonia, involving interactions between the incumbent oil shale based regime and wind, solar, nuclear and bioenergy as emerging niche challengers. The content analysis of news items in Estonian media reveals an inventory of 214 distinct incidents of energy

injustices across 21 different categories. We find that many experienced and anticipated injustices are deployed, often strategically, by certain actors to advocate specific energy futures and to influence current political choices. From the justice perspective our analysis thus raises a question whether it is ethical to use probable yet currently unrealized injustices related to regime destabilization and niche acceleration as a means to perpetuate injustices related to the optimization of the currently dominant regime.

Kivimaa, P. and Rogge, K. (2022)
Interplay of policy experimentation and institutional change in sustainability transitions: The case of mobility as a service in Finland.

Research Policy 51(1), 104412

[link](#)

While experimentation is at the heart of sustainability transitions, little attention has been paid to policy experimentation and its effects in advancing transitions. Drawing on the literatures on policy experimentation and institutional change in the context of sustainability transitions, we analyse an in-depth case study of the development of Mobility as a Service (MaaS) in Finland – one of the first countries globally to advance MaaS by government support. Our findings show how a potentially disruptive innovation, MaaS, can be traced back to a longer process of administrative reorientation and restructuring, i.e. gradual transformation in institutions, and has benefitted from cycles of policy experimentation, combined with the sequencing of policy strategies and further changes in the policy mix. Administrative restructuring has enabled policy experimentation that has led - via new vision building, networking and learning - to major regulatory change allowing market creation for MaaS. We conclude that the dynamics of policy mixes in transitions are influenced by short-term policy experimentation and long-term institutional change. More generally, institutional change is vital for enabling a favourable context for policy experimentation in sustainability transitions that in turn provides cognitive and normative learning to inform further institutional change.

Lowe, R. J. and Drummond, P. (2022)
Solar, wind and logistic substitution in global energy supply to 2050-Barriers and implications.

Renewable and Sustainable Energy Reviews, 153, 111720

[link](#)

The sustained rapid growth and learning rates displayed by solar PV and wind electricity generation capacity over recent decades appear to be unprecedented. With these technologies now available at costs competitive with - or below - those of fossil fuel incumbents in many

parts of the world, high rates of growth appear likely to continue. In this paper we use 'top-down' extrapolation of global trends and simple and transparent models to attempt to falsify the proposition that PV and wind have the potential to achieve dominance in global primary energy supply by 2050. We project future deployment of PV and wind using a logistic substitution model, and examine a series of potentially fundamental constraints that could inhibit continued growth. Adopting conservative assumptions, we find no insuperable constraints across physical and raw materials requirements, manufacturing capacity, energy balance (EROEI), system integration and macro-economic conditions, to this outcome. We also demonstrate synergy with direct air carbon capture and storage (DACCS) that would allow the achievement of global net-zero CO₂ emissions by mid-century. Achieving such an outcome would require large scale reconfiguration of the architecture of global and regional energy systems, particularly from 2040 onwards. Low cost primary electricity is likely to be a significant factor in driving such a reorganisation. But given the speed and depth of the transition, hurdles will remain that will require foresight and strategic, coordinated action to overcome.

Löhr, M. and Mattes, J. (2022)

Facing transition phase two: Analysing actor strategies in a stagnating acceleration phase.

Technological Forecasting and Social Change, 174, 121221

[link](#)

Energy transition processes are currently entering into a new phase which is characterised by the maturing of renewable energy technologies and the challenges of system integration and regulatory changes, in particular the introduction of tender schemes for onshore wind energy. In the German wind energy sector, these policy changes are resulting in a drop in build-out during a phase when acceleration rather than stagnation would be expected. Furthermore, several major wind actors are facing insolvency, instigating redundancies or deciding to relocate, increasing the level of uncertainty within the sector.

This paper analyses how actors in the wind sector are reacting to the introduction of tender schemes and how their strategic activities are affecting the transition process. We analyse four strategies: geographical diversification, cooperation/mergers and acquisitions (M&A), business field diversification and market exit. Specifically, we analyse the reactions of project developers, turbine manufacturers, energy utilities and banks. We show that the strategies chosen by key wind energy actors may actually be slowing down the transition process rather than accelerating it. We argue that adopting an actor strategy perspective provides new insights for sustainability transition research while

at the same time highlighting implications for public policy and strategic management.

Noll, D., Lauk, C., Haas, W., Singh, S. J., Petridis, P., and Wiedenhofer, D. (2021)

The Sociometabolic Transition of a Small Greek Island: Assessing Stock Dynamics, Resource Flows, and Material Circularity from 1929 to 2019.

Journal of Industrial Ecology

[link](#)

Their geomorphological characteristics make island systems special focal points for sustainability challenges. The Circular Economy (CE) Action Plan of the European Union foresees tailored solution sets for Europe's outermost regions and islands to tackle region-specific sustainability challenges. We address the question of how islands can achieve more sustainable resource use by utilizing the socioeconomic metabolism (SEM) framework to assess and explore CE strategies for the Greek island of Samothraki. For this purpose, we apply material and energy flow analysis on a regional level and derive, as one of the first studies, a complete time series from 1929 to 2019 for socioeconomic biophysical stocks and flows according to mass-balance principles for an island economy. Results show that in the past 90 years Samothraki's material stocks grew fivefold, domestic material consumption threefold, and solid waste generation fivefold. Samothraki transitioned from an almost entirely circular biophysical economy toward one in which 40% of input materials and 30% of output materials are estimated as non-circular. This transition resulted in an accumulated solid waste stock on the island almost half the size of current material stocks in use. With this study we aim at providing ideas and opportunities for achieving more sustainable and circular material use on small islands. The published SEM database aims at supporting the public and the private sector and the island community at large with information key to establishing more sustainable material and energy use patterns on Samothraki.

Nuru, J., Rhoades, J. L., and Sovacool, B. K. (2022)

Virtue or vice? Solar micro-grids and the dualistic nature of low-carbon energy transitions in rural Ghana.

Energy Research & Social Science, 83, 102352, 1-10

[link](#)

Low-carbon energy transitions scholarship has witnessed an exponential rise since the beginning of the millennium. Many studies have explored the different pathways to achieving global carbon neutrality in the

next few decades. Greater efforts have been focused on how poorer regions could be supported to achieve universal access to clean and affordable energy by 2030. However, little research has investigated the dualistic nature of low-carbon energy transitions vis-à-vis inherent contextual factors which could promote or hamper full realization of a broad array of benefits associated with sustainable energy projects in developing countries. Drawing upon interviews of experts and key informants, focus group discussion involving different groups of rural people in Ghana, alongside direct observation, we investigated the virtues and vices of solar micro-grid deployment in Ghanaian rural islands. Results of case studies from three rural islands show gradations of valuable outcomes from gender equity and social transformation to undesirable impacts of dispossession and conflicts. While the solar micro-grids engendered streams of benefits for the local people, the projects also exacerbated existing contextual issues and triggered novel challenges. These results may guide policy makers, practitioners, researchers, donors, and development partners to pay attention to these subtle issues in their efforts to promote low-carbon energy technologies in the developing countries.

Phirouzabadi, A. M., Blackmore, K., Savage, D., and Juniper, J. (2021)

Modelling and simulating a multi-modal and multi-dimensional technology interaction framework: The case of vehicle powertrain technologies in the US market.

Technological Forecasting and Social Change, 175, 121412

[link](#)

A multi-modal and multi-dimensional technology interaction framework is constructed to systematically and dynamically model and simulate the dimension, extent, and modes of multi-technology interactions. Using the Technological Innovation System (TIS), it is argued that a TIS' internal dynamics couple with the internal dynamics of neighbouring TISs vis-à-vis what is referred to as 'co-dynamics' which trade a mix of positive and negative externalities in the form of biological relationship modes. Based on the Lotka-Volterra equations, the framework is quantified and simulated via a computerised System Dynamics model, for the case of internal combustion engine, hybrid, and battery electric vehicles over 1985–2050 in the US market. The pure competition view in the strategic management literature is extended by the nuanced *multi-modal interactions* in ecology such as parasitic, commensal and amensalism modes. Additionally, the single-path view in the path dependency literature is extended by the nuanced *multi-dimensional interactions* such as knowledge cross-path interaction and market cross-

path interaction. Furthermore, the TIS framework is made more outward orientated by proposing the notion of 'co-dynamics' and motors of 'creative destruction' and 'creative accumulation'. It is concluded that innovation policy mixes can possess a triple nature of 'creation', 'destruction' and 'accumulation' for interacting TISs through positive and negative internalities and externalities.

Poulter, H. and Bolton, R (2022)

Remaking the regulatory model? Taking stock of ten years of customer engagement in Britain's energy networks.

Energy Research & Social Science, 85(11), 102389
[link](#)

Over the past decade, a concerted effort has been made in Britain to encourage and incentivise regulated energy network companies to engage directly with their customers through a process known as customer engagement (CE). Drawing on a series of semi-structured interviews and document analysis, the paper tracks the processes of implementing CE within regulation from 2010 to 2020. Given its increasing prominence in the regulatory framework for energy networks, the paper examines how various stakeholders involved in the regulatory process have experienced it and evaluate its importance. Based on this analysis we discuss what lessons can be learned as the challenge of transitioning to more active and flexible local and regional energy distribution networks is faced. We identify key challenges of moving from an experimental phase and embedding CE in the mainstream regulatory framework.

Reda, F., Ruggiero, S., Auvinen, K., and Temmes, A. (2021)

Towards low-carbon district heating: Investigating the socio-technical challenges of the urban energy transition.

Smart Energy 4, 100054

[link](#)

District heating is a major energy infrastructure in many urban settlements in the world, contributing significantly to greenhouse gas emissions. Decarbonising district heating is an important step towards the realisation of a carbon-neutral society that entails considerable socio-technical change. Building on sustainability transitions literature that has dealt with socio-technical reconfiguration, this paper investigates the barriers to the implementation of a low-carbon district heating system that is based on biomass incineration minimisation and the total phasing out of fossil fuels. Empirically, the study relies on an extensive stakeholder analysis that involved 44 organisations representing technology providers, energy companies, industry

organisations, policymakers, local authorities and researchers. The results show that while several stakeholder groups could converge on key issues such as the need to support certain technological niches and the danger of a biomass lock-in, divergences regarding barriers to be removed existed between policymakers, new entrant firms, and building owners. Cities were considered important actors for the implementation of the proposed low-carbon district heating concept. However, they should encourage building owners' participation in demand response schemes, decentralized renewable energy production, and the re-design of local electricity networks to support district heating electrification.

Sovacool, B. K. (2022)

A perspective on treaties, maximum wages, and carbon currencies: Innovative policy instruments for global decarbonization.

Energy Policy, 160, 112702, 1-7

[link](#)

Innovative policy instruments across the supply side (fossil fuel extraction), demand side (income and behaviour), and mediums of exchange (e.g., markets) can accelerate global decarbonization efforts in ways not yet supported by the global community. A fossil fuel non-proliferation treaty, a maximum wage and restrictions on wealth, and a carbon currency could radically alter how we extract, finance, and value fossil fuels and the changes in climate that result. In that vein, this article highlights the role of different and perhaps unacknowledged actors in accelerating decarbonization, notably those of new intergovernmental organizations, labor economists, central banks, insurers, accountants, and taxation specialists. It also discusses the benefits, and anticipated obstacles, to each policy innovation as well as what sorts of “systems transformation” they might achieve if implemented together.

Sovacool, B. K. (2021)

Clean, low-carbon but corrupt? Examining corruption risks and solutions for the renewable energy sector in Mexico, Malaysia, Kenya and South Africa.

Energy Strategy Reviews, 38, 100723, 1-21

[link](#)

A decarbonized global energy sector is expected to need cumulative investments in the tens to hundreds of trillions of dollars between now and 2050. Due to its size, the current climate-business environment is therefore prone to corruption risks. Yet such corruption risks are rarely explored within the research community. Much of the extant literature on energy and corruption focuses on fossil fuels, especially oil, coal, and natural gas. However, evidence is emerging that corruption

risks also feature in renewable energy markets. This paper asks: Who are the new private actors in selected renewable electricity markets in a sample of countries? How can they be profiled or categorized? To what extent do such actors face corruption risks? How do these actors manage or fail to manage corruption risks? More broadly, which successful collaboration mechanisms can be identified from the literature about how to reduce corruption? To provide an answer, in this paper the literature on renewable energy and corruption are extensively reviewed, with a focus on three particular sectors: hydroelectric dams, solar photovoltaic panels (in both grid-connected and off-grid configurations), and wind energy (including a mix of offshore and onshore designs). The paper then identifies eight distinct corruption risks evident across categories including nepotism, tender rigging, bribery, and tax evasion. The paper then explores particular corruption risks in four national contexts (Mexico, Malaysia, Kenya, and South Africa) before offering a suite of five recommendations and solutions to help address corruption. These solutions include corruption risk mapping, subsidy registers and sunset clauses, transparency initiatives, anti-corruption laws, and shared-ownership models.

Sovacool, B. K., Furszyfer Del Rio, D., and Martiskainen, M. (2021)

Can prosuming become perilous? Exploring systems of control and domestic abuse in the smart homes of the future.

Frontiers in Energy Research 9, 1-18.

[link](#)

In what ways can new, emerging digital technologies and energy business models such as “prosuming” become intertwined with troubling patterns of domestic abuse and violence? Domestic violence entails controlling, coercive or threatening behaviours, to gain or maintain power and control between intimate partners or family members regardless of gender or sexuality. The rapid development of digital communication services, smart homes, and digitalization processes such as prosuming create surprising threats related to technology-facilitated abuse. In this empirical study, based on a nationally representative survey of householders ($n = 1,032$ respondents) and three focus groups with the general public in different locations around the UK ($n = 18$ respondents), we explore the extent that prosuming technologies, smart grids and smart systems could act as potential enablers of domestic violence or systems of control. We also explore the use of smart systems as possible deterrents and mechanisms to reduce and address domestic violence and provide victim protection and recovery. In doing so, we explore user perceptions and preferences of smart systems, in relation to trust, monitoring, tracking, and surveillance.

We finally discuss our results through the themes of duality and policy and provide conclusions with recommendations for further research.

Trahan, R. T. and Hess, D. J. (2021)

Who Controls Electricity Transitions? Digitization, Decarbonization, and Local Power Organizations.

Energy Research and Social Science, 80, 102219

[link](#)

Much of the work on technology transitions and electricity has concentrated on sustainability from the perspective of centralized generation and transmission companies. For example, there is a substantial literature in energy social science on the role that the smart grid plays in the sustainable energy transition, and much of that research assumes continuity with a traditional centralized electric system, modified slightly to admit some distributed energy resources. We start from a different perspective. First, our focus is less on centralized generation and transmission companies and more on organizations that distribute electricity and related services to end customers in a defined geographic area. These entities are described in a variety of ways across countries; we use the term “local power organizations” (LPOs). Second, we focus less directly on the sustainability transition as such and more on the complex sociotechnical changes produced by specific digital tools. We open the black box of digital technologies that underpin the sustainability transition to highlight implicated sociotechnical issues, ranging from individual privacy to control and ownership of electricity. We then outline three central challenges of digitization that suggest new directions in energy social science research as the future control of electricity develops along its digital pathway.

Werner, V., Onufrey, K., and Magnusson, T. (2021)

From protection to selective exposure: commercial demonstrations as steppingstones for upscaled technology diffusion.

International Journal of Automotive Technology and Management, 21(3), 250-272

[link](#)

Examining how actively constructed processes of demand articulation can enable upscaled technology diffusion, this paper introduces a distinction between pre-commercial and commercial demonstrations. The paper argues that these two forms of demonstration play different roles in the adoption of innovative technologies. Whereas pre-commercial demonstrations are initiated to facilitate entry into niche markets, commercial demonstrations are devised to ease entry to mass markets. The paper presents a comparative case analysis of commercial demonstration projects featuring

electrified heavy trucks in urban applications. The analysis focuses on the relation between the technologies and the selection environments they operate in, showing how stakeholders actively shape selection environments in commercial demonstrations. The analysis further shows how network relationships and lessons learned empower stakeholders to articulate forceful demands on institutional changes that promote an upscaled technology diffusion.

Westskog, H., Julsrud, T. E., Kallbekken, S., Frenken, K., Schor, J., and Standal, K. (2021)

The role of community sharing in sustainability transformation: case studies from Norway.

Sustainability: Science, Practice and Policy, 17:1, 334-348

[link](#)

Based on three case studies of community sharing in different sectors of society, we address how and under what conditions community sharing can contribute to sustainability transformation. Considering modes of exchange and leverage points, we analyze how community sharing can add to transformation when sharing systems are designed to intervene at both shallow and deep leverage points. Our case studies indicate that sustainability transformations are dynamic processes in which even shallow levels of leverage can affect change. We show that community sharing can be upscaled through restructuring institutions via redistributive exchange systems, while initiatives supported by strong and lasting institutions are in the best position to contribute to change. Furthermore, our results suggest that sharing practices may strengthen ties and trust in an enterprise or local community. Finally, community-sharing systems that build on existing values in line with sustainability transformation may be in the best position to contribute to deeper levers of change.